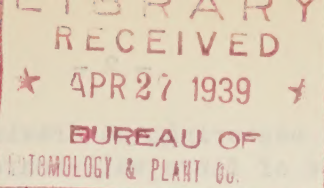


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United States Department of Agriculture  
Bureau of Entomology and Plant Quarantine

A LIGHT AND CAMERA STAND FOR PHOTOGRAPHIC COPY WORK

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A combined light and camera stand for use in copying line drawings was constructed at the Grand Junction, Colo., field laboratory and has been found to be very convenient and time saving. The stand with its lights as described gives an even distribution of light over drawings up to 26 by 33 inches and is inexpensive to construct.

Construction

The frame which holds the reflector (fig. 1, a) and lights (fig. 2, c) is constructed of 2- by 4-inch lumber and is fastened together on the inside of the frame with shelf braces (fig. 3, h). The sides of the frame are extended downward to form the front legs of the stand. The back legs are made of 2- by 2-inch pieces and support the side arms (fig. 2, j). The legs are fastened by shelf braces (fig. 1, h) to a base of 2- by 4-inch material, under which are gliding casters (fig. 1, i) to facilitate moving the stand. A 1- by 4-inch piece between these bases helps to stiffen the legs. The ends of the board supporting the camera (fig. 2, b) are fastened to each side arm (fig. 2, j) by a bolt with a wing nut (fig. 1, g), which passes through a slot running the length of the arm and permits the camera to be clamped at any distance along the depth of the stand. A graduated stick (cut from an ordinary yard stick) is fastened to the inner edge of each arm to assist in clamping the camera support (fig. 2, b) parallel with the front of the stand. The camera is fastened to the camera support by a thumb screw in the same manner as it would be fastened to a tripod.

The reflector (fig. 1, a) consists of two pieces (fig. 2, a<sub>1</sub> and a<sub>2</sub>) of 22-gauge galvanized sheet iron. The inner and outer sides are flared 1 inch from the edges of the frame and are fastened to the frame with small nails. The inside of the reflector is painted with white gloss paint to better reflect the light.

The light sockets (fig. 3, d) are mounted in the frame in holes which are just the size to hold them snugly. The sockets are connected in parallel to a cord (fig. 3, k) which is plugged into an electric outlet. Outside frosted, round, 25-watt globes are used.



To facilitate centering the drawing on the wall in front of the reflector a piece of fibre wall-board material was fastened to the wall and ruled off in 1-inch squares, the lines running parallel and perpendicular to the floor. Two lines were marked on the floor to indicate the proper alignment of the stand. It was found that three positions of the stand (15, 30, and 45 inches away from the drawing) would give opportunity for focusing on all sizes of drawings which the apparatus would accomodate. These positions were also indicated by marks on the floor. The position used will depend upon the size of the drawing to be photographed. The time of exposure given in table 1 was determined for each size of drawing. A photograph of the complete set-up is shown in figure 4.

Table 1.--Exposure time for process films on f. 16 stop  
(Time based on reduction or enlargement of  
all drawings to full size of camera plate)

Distance of light stand from object (Inches)	Longest diameter or size of drawing (Inches)	Exposure (Seconds)
15	4	60
	5	56
	6	52
	7	48
	8	44
	9	40
	10	36
	11	32
	12	28
	13	24
	14	20
30	10 by 14 to 20 by 28	40
45	20 by 28 to 31 by 44	75

#### Operation

The stand is used in a room with the shades drawn to exclude other light. A 5-by-7 camera with a stop opening of f. 16 and process film are used. Any size and type of camera can be used provided it has a ground glass back for focusing and provided the lens comes in the center of the reflector. The position of the stand and the exposure time can be read from the table, and it remains only to place the camera in such a position that the drawing will occupy the full size of the camera plate when in focus. This is done by the adjustment of the movable camera support.

On drawings larger than 26 by 33 inches the light becomes less intense around the outer edges and the lighting is not entirely satisfactory.

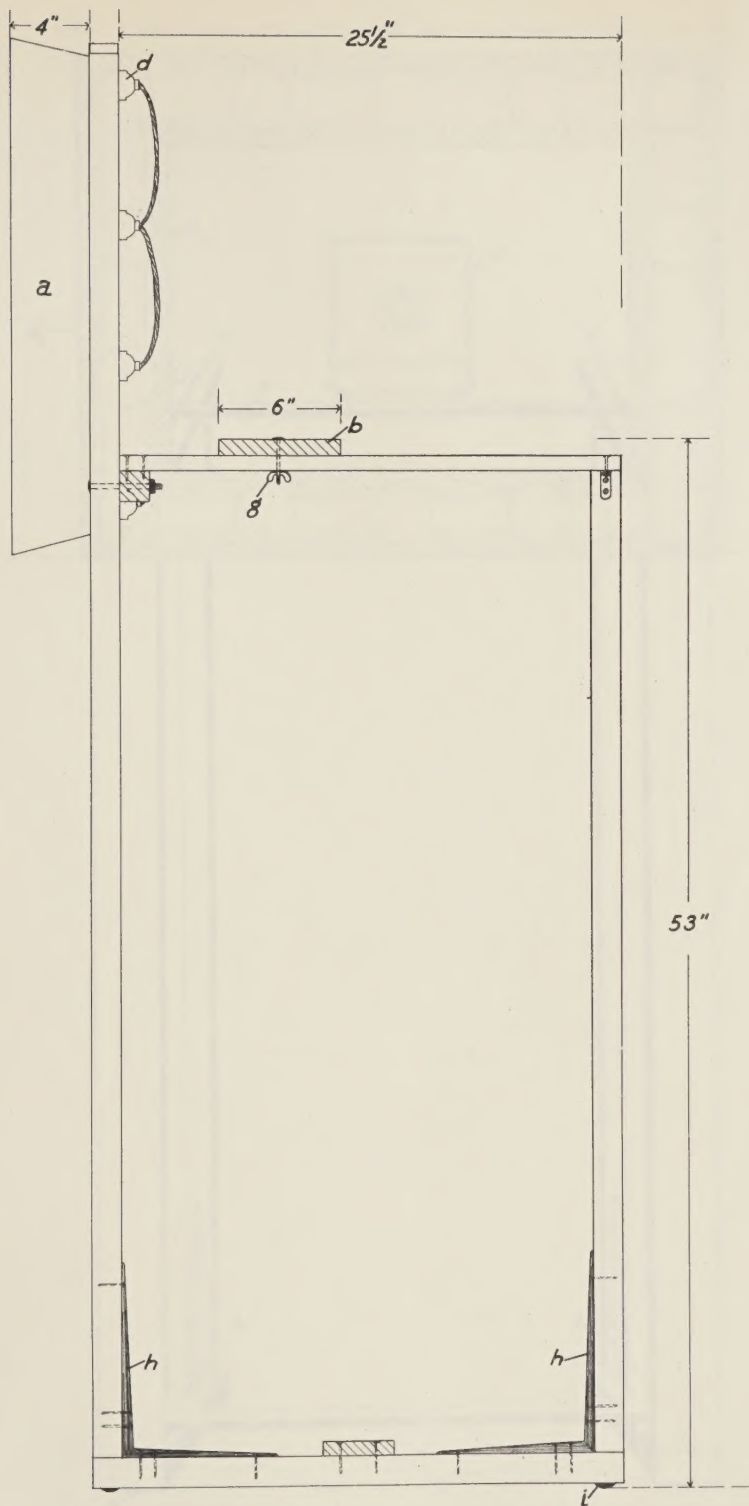


Figure 1.—Side view of stand. a, reflector; b, camera support; d, brass electric light sockets; g, wing nut and bolt for holding camera support in position; h, shelf brackets used for strengthening and bracing stand; i, gliding casters.





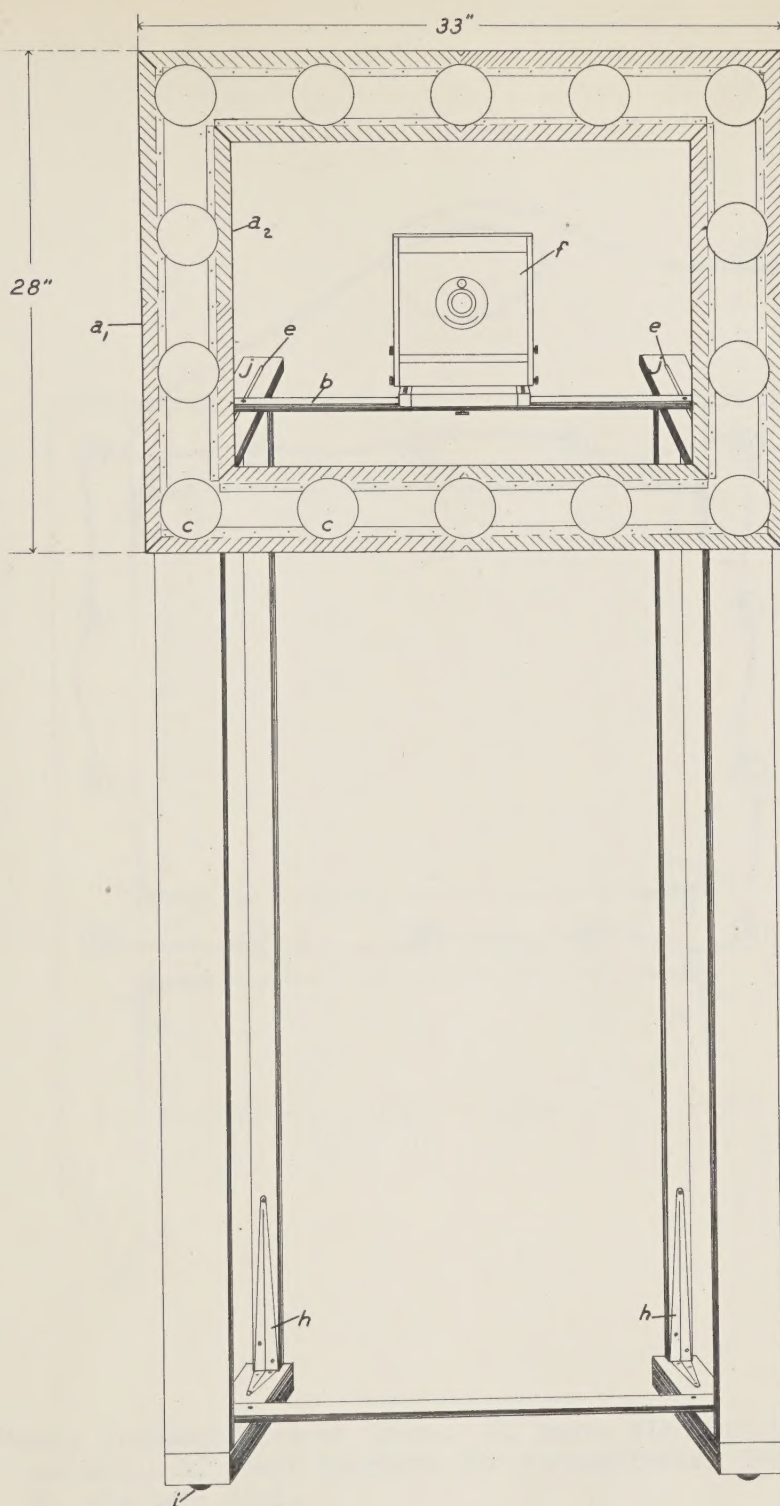


Figure 2.—Front view of stand.  $a_1$  and  $a_2$ , sides of reflector;  $b$ , camera support;  $c$ , light bulbs;  $e$ , slots to allow for movement of camera support;  $f$ , camera;  $h$ , shelf brackets;  $j$ , side arm on which camera support rests.





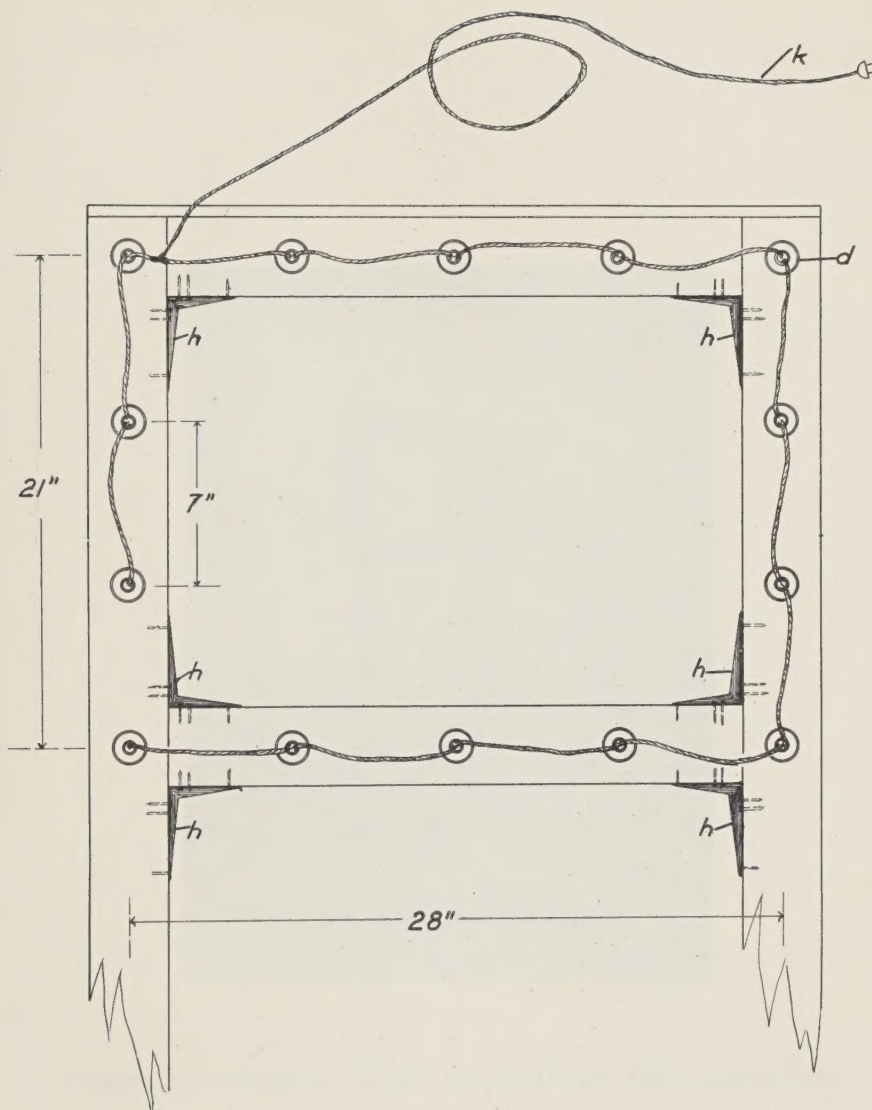


Figure 3.--Rear view of frame. d, brass electric light sockets; h, shelf brackets for strengthening frame; k, electric cord.



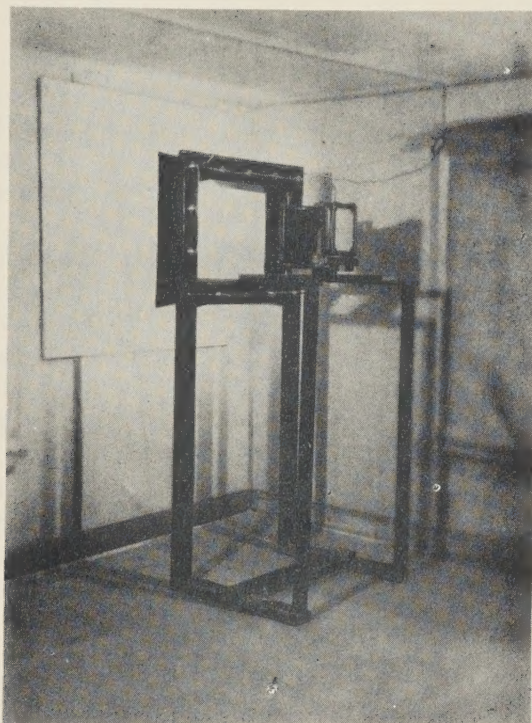


Figure 4.--Camera stand in position for operation.

